KIBABII UNIVERSITY

UNIVERSITY EXAMINATIONS
2020/2021 ACADEMIC YEAR

END OF SEMESTER EXAMINATIONS
YEAR FOUR SEMESTER ONE EXAMINATIONS

FOR THE DEGREE IN
(COMPUTER SCIENCE)

COURSE CODE : **CSC 461E**

COURSE TITLE : **DATABASE ADMINISTRATION AND PROGRAMMING**

DATE: 22/06/2021   TIME: 09.00 A.M – 11.00 A.M

INSTRUCTIONS TO CANDIDATES

ANSWER QUESTIONS ONE and ANY OTHER TWO

QUESTION ONE [COMPULSORY] [30 MARKS]

a) Explain what you understand by the term concurrency control and outline its properties.

[4 Marks]

b) With the aid of a suitable example, describe the uncommitted dependency (dirty read) problem and recommend a solution.

[5 Marks]

c) Explain how DBMS locks work.

[2 Marks]

d) Distinguish between the various types of locks.

[4 Marks]

e) For a transaction to either abort or commit there are other transition states that it must undergo. Briefly explain the states that a transaction must undergo.

[6 Marks]

f) What are the necessary conditions that necessitate a rollback or a rollforward be done on an executing transaction?

[4 Marks]

g) With the aid of an example briefly discuss the two deadlock prevention schemes that use timestamping.

[5 Marks]

QUESTION TWO [20 MARKS]

a) Explain what is meant by a transaction. Why are transactions important units of operation in a DBMS?

[3 Marks]

b) The consistency and reliability aspects of transactions are due to the 'Acidity' properties of transactions. Discuss each of these properties and how they relate to the concurrency control and recovery mechanisms. Give examples to illustrate your answer.

[8 Marks]

c) What is a transaction log? Briefly explain the function of the transaction log in SQL Server.

[4 Marks]

d) For a system to detect and recover from a deadlock situation, the system has to deal with several issues. Outline the issues and briefly discuss how the issues affect this process.

[5 Marks]

QUESTION THREE [20 MARKS]

a) With the aid of a diagram and using the SQL Server architecture, briefly explain the process of executing an SQL statement.   **[12 Marks]**

b) Define the term deadlock and outline the two main methods of dealing with a deadlock problem.   **[3 Marks]**

c) With the aid of an example briefly describe the components that make up the wait – for graph and explain how the graph can be used in deadlock detection.   **[5marks]**

QUESTION FOUR [20 MARKS]

a) Define the term timestamp in relation to a transaction.   **[2 Marks]**

b) Describe, with examples, the types of problems that can occur in a multi-user environment when concurrent access to the database is allowed.   **[10 Marks]**

c) Explain the concepts of serial, nonserial, and serializable schedules. State the rules for equivalence of schedules.   **[8 Marks]**

QUESTION FIVE [20 MARKS]

a) Explain with justification why a multi-user DBMS should provide a recovery mechanism.   **[3 Marks]**

b) State and explain four major security threats of database system? Discuss in detail the access control measures of which provide security of data in the database   **[5 marks]**

c) List and briefly explain the security features of a DBMS   **[7 Marks]**

d) Describe various database integrity features implemented in a DBMS you are familiar with.   **[5 Marks]**